

1-5 Solving Inequalities

Properties of Order

$$a, b, c \in R$$

Addition

If $a > b$, then $a + c > b + c$

If $a < b$, then $a + c < b + c$

Subtraction

If $a > b$, then $a - c > b - c$

If $a < b$, then $a - c < b - c$

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$$a, b, c \in R$$

Multiplication

If $a > b$, and if c is positive, then $a \cdot c > b \cdot c$. .

If $a < b$, and if c is positive, then $a \cdot c < b \cdot c$. .

If $a > b$, and if c is negative, then $a \cdot c < b \cdot c$. .

If $a < b$, and if c is negative, then $a \cdot c > b \cdot c$. .

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Division

If $a > b$, and if c is positive, then

$$\frac{a}{c} > \frac{b}{c}$$

If $a < b$, and if c is positive, then

$$\frac{a}{c} < \frac{b}{c}$$

If $a > b$, and if c is negative, then

$$\frac{a}{c} < \frac{b}{c}$$

If $a < b$, and if c is negative, then

$$\frac{a}{c} > \frac{b}{c}$$

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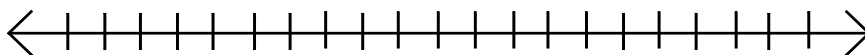
Examples

ex 1:

$$3(x - 5) < 30$$

$$x - 5 < 10$$

$$x < 15$$



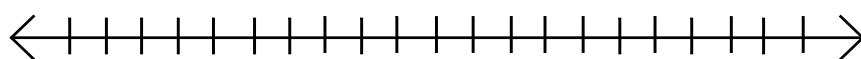
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ex 2:

$$5 - 12y < 65$$

$$-12y < 60$$

$$y > -5$$



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ex 3:

$$4 \left[\frac{3(2-5x)}{4} - 1 \leq 5 - \frac{3(3-2x)}{2} \right]$$

$$3(2-5x) - 4 \leq 20 - 6(3-2x)$$

$$6 - 15x - 4 \leq 20 - 18 + 12x$$

$$0 \leq 27x$$

$$0 \leq x$$

$$x \geq 0$$



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Notation

set-builder notation

ex: $\{x \mid x > -8\}$

interval notation

"the set of all x's
such that $x > -8$ "

$+\infty$ $-\infty$

(open) [closed]

ex ① $(-\infty, 15)$

ex 2 $(-5, +\infty)$

ex 3 $[0, +\infty)$

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ex 1 $\{x \mid x < 15\}$

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Do: Graph and Notations

1. $12 \geq -3p$

2. $-x > \frac{x-7}{2}$

3. $x+5 < x-3$

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Homework

p. 37-38

#s 15-43 odd

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